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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/901,130	07/10/2001	Kazuya Iwamoto	L7016.01122	5796

7590 04/01/2004

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EXAMINER	
CREPEAU, JONATHAN	

ART UNIT	PAPER NUMBER
1746	

DATE MAILED: 04/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/901,130	IWAMOTO ET AL.	
	Examiner	Art Unit	
	Jonathan S. Crepeau	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-4,23,24 and 26* is/are allowed.

6)☒ Claim(s) *5-22 and 25* is/are rejected.

7)☒ Claim(s) *27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1-24 and newly added claims 25-27. Applicant's arguments regarding claims 10 and 11 are persuasive and the rejection of these claims over the FR '099 reference is withdrawn. However, these claims are newly rejected under 35 USC §103 over newly discovered prior art. Claims 5-9 and 12-22 remain rejected for the reasons of record, and claim 25 is newly rejected under 35 USC §102. Claims 1-4, 23, 24, and 26 are allowed, and claim 27 contains allowable subject matter. As the new rejection of claims 10 and 11 was not necessitated by amendment, this action is non-final.

Claim Rejections - 35 USC § 102

2. Claim 5 is rejected under 35 U.S.C. 102(b) as being anticipated by WO 99/30381. The reference discloses a nonaqueous electrochemical apparatus wherein the surface tension of the electrolyte is 28.7 dynes/cm (see Table 2). The surface free energy of a solid element (i.e., separator) is between 30 and 35 dynes/cm (see page 2, line 2). As these values are anticipatory of the ranges recited in claim 5, the claim is therefore anticipated by the reference.

3. Claim 25 is rejected under 35 U.S.C. 102(b) as being anticipated by JP 7-153467. The reference discloses a nonaqueous electrochemical apparatus comprising a surfactant in the electrode composition (see abstract). The surfactant may have the following composition (see paragraph 21 of the machine translation):

Thus, the subject matter of claim 25 is anticipated.

Claim Rejections - 35 USC § 103

4. Claims 6-8 and 12-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/30381.

The reference is applied to claim 5 for the reasons stated above. Further, regarding claims 6 and 12, the negative electrode contains carbon (see page 12, line 5). Regarding claims 7, 8, 12, and 17, the electrolyte contains a fluorine-containing surfactant salt (see abstract). Regarding claim 12, the positive electrode comprises a lithium-containing metal oxide (see page 12, line 14). Regarding claims 12, 13, and 15, the electrolyte contains a nonaqueous solvent such as propylene carbonate or gamma-butyrolactone (see page 11, lines 11 and 12) and a solute (see page 3, line 31). Regarding claims 14, 21, and 22, the electrolyte may contain an additive comprising a carbonic acid ester or a sulfur compound (e.g., sulfolane) (see page 11, lines 10 and 16). Regarding claims 15, 16, and 19, the solvent contains a plurality of cyclic carbonic acid

esters (i.e., ethylene carbonate and propylene carbonate) and the solute contains lithium (see Example 5). Regarding claim 18, propylene carbonate has a melting point of –49 degrees C. Regarding claim 20, the solute may comprise any of lithium tetrafluoroborate, lithium hexafluorophosphate, lithium bistrifluoromethanesulfonimide, or lithium bispentafluoro-ethanesulfonimide (see claim 11 of the reference).

The reference does not expressly teach that the surface free energy of the carbon-containing electrode is in the range of 1-35 dynes/cm, as recited in claim 6.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be able to surmise from the reference that the surface free energy of the carbon-containing electrode would fall within the claimed ranges. On page 1, line 32 et seq., the reference teaches that "[s]eparators are typically constructed from microporous polyolefin films which can have a surface energy as low as 30-35 dynes/cm. Electrodes are also frequently constructed from hard-to-wet (i.e., low surface energy) materials, including polytetrafluoroethylene and polyvinylidene fluoride binders." The artisan could reasonably surmise from this disclosure that the surface energy of the electrodes of WO '381 is about the same as that of the separator, i.e., 30-35 dynes/cm. Accordingly, the range recited in claim 6 would be rendered obvious.

Regarding the recitation in claim 20 that the solute contains at least one of lithium tetrafluoroborate and lithium hexafluorophosphate and at least one of lithium bistrifluoromethanesulfonimide and lithium bispentafluoroethanesulfonimide, the disclosure of the reference is sufficient to render this subject matter obvious. As noted above, the reference discloses that each of these compounds is useful as a solute. The courts have held that it is *prima*

facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose (*In re Kerkhoven*, 205 USPQ 1069 (CCPA 1980)). Accordingly, the subject matter of claim 20 is not considered to distinguish over the reference.

5. Claims 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/30381 as applied to claims 6-8 and 12-22 above, and further in view of FR 2704099.

WO '381 does not expressly teach that the fluorine-containing surfactant comprises a perfluoroalkylethylene oxide adduct, as recited in claim 9.

FR '099 teaches a lithium battery comprising a fluorinated surfactant in the abstract. At the top of page 6, the reference teaches that the surfactant may comprise a perfluoroalkylethylene oxide adduct (i.e., C_6F_{13}-C_2H_4-$O(OC_2H_4)_{12}H$).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the surfactant of the French reference in the battery of WO '381. In the abstract, the French reference teaches that the presence of the surfactant in the electrolyte "improves the reactivity of Li with the electrolyte and improves the faradic yield in the process of depositon and redissolution which occurs during the charge and discharge cycles of the battery." Accordingly, the artisan would be motivated to use the surfactant of the French reference in the battery of WO '381.

6. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/30381 in view of FR 2704099 as applied to claim 9 above, and further in view of JP 7-153467.

FR '099 does not expressly teach that the fluorine-containing surfactant comprises a material having the composition recited in claims 10 and 11, e.g., C_8F_{17}--$SO_2NC_3H_7$--$CH_2CH_2O(CH_2CH_2O)_{20}H$.

As noted above, JP '467 teaches such a material in paragraph 21.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the surfactant of the Japanese reference as the surfactant of the French reference. In paragraph 3, the Japanese reference teaches that "the technical problem of this invention is obtaining a chemical cell with little fluctuation in high discharge capacity and manufacture." Additionally, more broadly, the reference identifies numerous surfactants which are useful in nonaqueous electrochemical cells. The selection of a known material based on its suitability for its intended has generally been held to be *prima facie* obvious (MPEP §2144.07). Accordingly, the subject matter of claims 10 and 11 would be rendered obvious to the skilled artisan.

Response to Arguments

7. Applicant's arguments filed January 5, 2004 have been fully considered but they are not persuasive as they relate to the present rejections. Independent claim 5 has not been amended,

and as such, the claim is still anticipated by the WO '381 reference. Specifically, claim 5 does not recite that the surface tension of the electrolyte is greater than the surface energy of the solid elements, as is recited in the other independent claims.

Allowable Subject Matter

8. Claims 1-4, 23, 24, and 26 are allowed.

9. Claim 27 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

Independent claims 1 and 3 each recite, among other features, that the surface tension of the electrolyte is more than the surface free energy of the electrode, and claims 2 and 3 each recite that the surface tension of the electrolyte is more than the surface free energy of the separator. WO 99/30381 is the closest prior art to this subject matter. However, the reference teaches on page 6 that the surface energy of the liquid should be less than the surface energy of the solid elements. Accordingly, as the reference does not teach or fairly suggest that the surface energy of the liquid should be *more* than the surface energy of the solid elements, claims 1, 2, and 3 are allowable.

Independent claim 26 and dependent claim 27 each recite a surfactant composition comprising, among other groups, a --CONH-- group. JP 7-153467, the closest prior art, teaches a number of relevant surfactant compositions (see paragraph 20) but fails to teach a composition

having the claimed --CONH-- group. Accordingly, claim 26 is allowable and claim 27 contains allowable subject matter.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Jonathan Crepeau
Patent Examiner
Art Unit 1746
March 29, 2004